INDIANA DEPARTMENT OF TRANSPORTATION MATERIALS AND TESTS DIVISION

CERTIFIED HOT MIX ASPHALT PRODUCER PROGRAM ITM NO. 582-01P

1.0 SCOPE.

- **1.1** This procedure covers the requirements for a HMA plant to become a Certified Hot Mix Asphalt Producer.
- 1.2 The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.
- 1.3 This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITMs use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 Documents required by the Program may be maintained electronically or by hard copies.

2.2 AASHTO Standards.

T 27	Sieve Analysis of Fine and Coarse Aggregates		
T 40	Sampling Bituminous Materials		
T 166	Bulk Specific Gravity of Compacted Bituminous Mixtures Using		
	Saturated Surface-Dry Specimens		
T 209	Theoretical Maximum Specific Gravity and Density of Bituminous Paving		
	Mixtures		
T 255	Total Moisture Content of Aggregate by Drying		
T 275	Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-		
	Coated Specimens		
T 287	Asphalt Cement Content of Asphalt Concrete Mixtures by the Nuclear		
	Method		
T 312	Preparing and Determining the Density of Hot Mix Asphalt (HMA)		
	Specimens by Means of the SHRP Gyratory Compactor		

2.3 ASTM Standards.

D 5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
E 29	Practice for Using Significant Digits in Test Data to Determine
	Conformance with Specifications

2.4 ITM Standards.

207	Procedures for Sampling Stockpiled Aggregates	
571	Quantitative Extraction of Asphalt/Binder and Gradation of Extracted	
	Aggregate from HMA Mixtures	
572	Drying HMA Mixtures	
580	Sampling HMA	
586	Binder Content by Ignition	
587	Reducing HMA Samples to Testing Size	
902	Verifying Sieves	
903	Verifying Ovens	
905	Verifying Vacuum Systems	
906	Verifying Mechanical Shakers	
908	Verifying Calibrations Settings for Superpave Gyratory Compactors	
909	Verifying Thermometers	
910	Verifying Balances	

2.5 A Certified Plant laboratory shall have the following current documents on file:

- a) Indiana Department of Transportation Certified Hot Mix Asphalt Producer Program (ITM 582).
- **b**) Indiana Department of Transportation Standard Specifications (Includes applicable Supplemental Specifications).
- c) Pertinent contract Special Provisions.
- d) Indiana Hot Mix Asphalt Quality Assurance Certified Technician Program Manual.
- e) All applicable INDOT, AASHTO, and ASTM Test Methods.
- f) Testing equipment calibrations or verifications.
- g) Mix design, DMF, and JMF for each Mixture.
- **h**) Fines correction data for each DMF and JMF, if applicable.
- i) Process control test results.
- j) Control charts.

2.6 A Certified Plant shall have the following current documents on file:

- a) The Quality Control Plan (QCP) for the Certified Plant.
- **b**) Binder certifications from an Approved Supplier Certification producer.
- c) Instructions from the manufacturer concerning storage and handling of the binder.
- d) Plant calibrations for each DMF.
- e) Diary.
- f) Calibration of Plant scales., and verification of meters.

3.0 TERMINOLOGY.

3.1 Terms and Abbreviations. Definitions for terms and abbreviations will be in accordance with the Department's Standard Specifications Section 101 and the following:

- **3.2 Actual Binder Content.** The binder content determined in accordance with ITM 586 or the binder content determined in accordance with ITM 571 added to the binder percent absorption from the DMF.
- **3.3** Addenda. Any addition or deletion to the QCP.
- **3.4 Addenda Summary Sheet.** A page of the QCP that is used to record a brief description of addenda until such time that the revisions are incorporated into the QCP.
- **3.5 Certified Plant.** Any Hot Mix Plant that meets the requirements of the Program, and continues to be under the same ownership.
- **3.6** Coarse Aggregate. Aggregate that has a minimum of 20 percent retained on the No. 4 sieve (4.75 mm).
- **3.7 District.** The Department's District Office responsible for administrating the materials and tests function in a local area of the state.
- **3.8 Division.** The Materials and Tests Division of the Indiana Department of Transportation, located at 120 S. Shortridge Rd. in Indianapolis, Indiana 46219-0389.
- **3.9 Fine Aggregate.** Aggregate that is 100 percent passing the 3/8 in. (9.5 mm) sieve and a minimum of 80 percent passing the No. 4 sieve (4.75 mm).
- **3.10 Mixture.** HMA produced in accordance with the Certified Hot Mix Asphalt Producer Program for Department use.
- **3.11 Producer.** A company or owner who shall assume responsibility for a Certified Plant in compliance with the Program.
- **3.12 Program.** The Department Certified Hot Mix Asphalt Producer Program.
- **3.13 Qualified Technician.** An individual who has successfully completed the written and proficiency testing requirements of the Department Qualified Laboratory and Technician Program.
- **4.0 SIGNIFICANCE AND USE.** The Indiana Certified Hot Mix Asphalt Producer Program is a program whereby the Producer takes responsibility for all aspects of the production of a HMA in accordance with contract requirements, and the Department monitors the Producers production, sampling, and testing procedures.

PRODUCER PERSONNEL. The Producer personnel shall include a Management Representative and a Certified Asphalt Technician.

- **5.1 Management Representative.** The Management Representative shall be responsible for all aspects of production and control required by the Program at a Certified Plant.
- **5.2 Certified Asphalt Technician.** A Certified Asphalt Technician is a Producer or Consultant employee who has been certified by the Department.

The Certified Asphalt Technician shall compact and analyze the HMA specimens, and perform the maximum specific gravity test. The technician shall supervise all other sampling and testing of materials, the maintenance of control charts, and the maintenance of the diary. All sampling and testing used for acceptance of materials shall be conducted by a Qualified Technician.

6.0 LABORATORY.

- 6.1 Process control testing shall be performed at the Certified Plant or as permitted in 6.2. The Producer shall provide and maintain a laboratory for process control testing. The laboratory shall have the necessary space, equipment, and supplies for the tests to be performed. The laboratory testing equipment shall meet the requirements of the test methods identified for the required sampling and testing, except that an electronic balance shall be provided. The electronic balance shall be readable to 0.1 g and accurate to 0.2 g or 0.1 percent of the test load, whichever is greater, at any point within the range of use. The gyratory compactor shall be on the approved SHRP gyratory compactor list.
- Performance of process control tests at laboratory facilities other than at the Certified Plant will be permitted provided that all test procedure criteria are satisfied, and the test results are furnished in writing to the Certified Plant within 24 h of sampling.
- 6.3 The Engineer shall be permitted access to inspect any laboratory used for process control testing, and witness process control activities during production of Mixtures.

7.0 TEST EQUIPMENT CALIBRATION.

7.1 The test equipment furnished by the Producer shall be properly calibrated or verified and maintained within the limits described in the applicable test method.

7.2 The Producer shall calibrate or verify equipment at the frequency indicated.

		Minimum	
Equipment	Requirement	Frequency	Procedure
Balances	Calibrate	12 mo.	ITM 910
Gyratory Compactor	Calibrate	1 mo.	ITM 908
Ignition Oven	Calibrate	Each Mix	ITM 586
Mechanical Shakers	Check Sieving Thoroughness	12 mo.	ITM 906
Nuclear Asphalt	Calibrate	Each Mix	AASHTO T 287
Content Gauge			
Ovens	Verify Temp. Settings	6 mo.	ITM 903
Sieves	Check Physical	6 mo.	ITM 902
	Condition		
Thermometers	Calibrate	6 mo.	ITM 909
Vacuum Pump	Check Pressure	12 mo.	ITM 905
Volumetric Flask	Calibrate	1 mo.	AASHTO T 209

- 7.3 The equipment calibration or verification documentation shall include:
 - **a)** A description of the equipment calibrated or verified including Model and Serial Number.
 - **b)** Name of the person performing the calibration or verification.
 - c) Identification of the calibration equipment used, if any (namely, standard weights, proving rings, thermometers, etc.).
 - **d)** Last date calibration or verification was performed and next due date.
 - e) A reference to the procedure used.
 - **f)** Detailed records showing the results of the calibration or verification performed.

8.0 DIARY.

- **8.1** The Producer shall maintain a diary at the Certified Plant. The diary shall be an open format book with at least one page devoted to each day Mixture is produced.
- **8.2** The Producer shall keep the diary on file for a minimum period of three years.
- **8.3** Entries in the diary shall as a minimum include:
 - **a)** The quantity of Mixture produced, DMF or JMF number, and the contract or purchase order number for each Mixture.
 - **b)** The time the sample was obtained and the time the test was completed.
 - c) Nonconforming tests and the resulting corrective action taken.

- **d**) Any significant events or problems.
- 8.4 The entry in the diary shall be signed by the Certified Asphalt Technician. On occasion it may be signed by another person; however, it must then be counter-signed by the Certified Asphalt Technician.

9.0 MATERIALS SAMPLING AND TESTING.

- 9.1 The Producer shall designate the sampling and sample reduction procedures, sampling location, and size of samples necessary for testing. Sampling shall be performed on uniform tonnage increments on a random basis. HMA shall be sampled in accordance with ITM 580 and may be obtained at the Certified Plant site or from the pavement site for binder content and gradation only. After the adjustment period for each DMF, all HMA samples shall be obtained from only one site. Testing of the samples shall be completed within 24 h of the time the sample was taken. Test values shall be reported to the nearest 0.1 percent, except for the coarse aggregate angularity content and temperature of HMA which shall be reported to the nearest 1 percent and 1°F respectively. Rounding shall be in accordance with ASTM E 29 using the rounding method. The Producer shall keep the test results on file for a minimum period of three years. The test methods and minimum frequencies of the process control tests for each mix design shall be as designated herein.
- 9.2 Blended Aggregate. A minimum of one sample shall be obtained and tested for gradation in accordance with AASHTO T 27 from each 2000 t of base or intermediate Mixtures and each 1200 t of surface Mixture. When the sample for a drum mix plant is obtained from the cold feed belt or the belt discharge, the total moisture content of the sample shall be determined in accordance with AASHTO T 255. The procedure for determining the blended aggregate gradation shall be as stated in the QCP or as follows.
 - **9.2.1 Batch Plants.** The blended aggregate gradation shall be determined by calculating the combined gradation of the aggregate from each hot bin, or by determining the gradation from a HMA sample. If the gradation from a HMA sample is used, hot bin samples shall be obtained at the same frequency as the HMA sample and used only to determine the percent of aggregates larger than the screen controlling the maximum size of the aggregate in each bin.
 - **9.2.2 Drum Plants.** The blended aggregate gradation shall be determined using aggregate samples from the cold feed belt or belt discharge, or by determining the gradation from a HMA sample. If the gradation from a HMA sample is used, the gradation of each aggregate stockpile used in the mixture shall be determined at a frequency of one sample for each 1000 t of each aggregate, but not required to exceed one sample per calendar day.
- **9.3 Hot Mix Asphalt.** Samples shall be obtained to determine the voids and VMA of the Mixture. HMA specimens shall be compacted to Ndes in accordance with

AASHTO T 312. If heating of the mixture is required to achieve the compaction temperature, the mixture shall be placed in a covered container. The VMA shall be calculated using the actual binder content from the most recent binder content determination. The maximum specific gravity shall be determined in accordance with AASHTO T 209. The minimum frequency of sampling shall be:

- a) The first 1000 t and each subsequent 2000 t for base or intermediate Mixtures.
- **b)** The first 600 t and each subsequent 1200 t for surface Mixtures.

All HMA specimens and uncompacted Mixture for the maximum specific gravity test shall be given to the District Materials and Tests Engineer (DMTE).

9.3.1 One sample shall be obtained and tested for coarse aggregate angularity for Mixtures containing gravel, binder content, and moisture content. The minimum frequency of sampling shall be one sample for each 2000 t of base or intermediate Mixtures and each 1200 t of surface Mixtures. The samples shall be tested in accordance with one of the following procedures or other procedures as stated in the QCP.

9.3.2 Binder Content.

- a) Extraction (ITM 571). The procedure for the fines correction shall be designated.
- **b)** Nuclear Asphalt Content Gauge (AASHTO T 287).
- c) Ignition Method (ITM 586).

9.3.3 Moisture Content (ITM 572).

9.3.4 Coarse Aggregate Angularity (ASTM D 5821).

9.4 Recycled Materials. A minimum of one sample shall be obtained in accordance with ITM 207 for each 1000 t of recycled materials or another frequency approved in the QCP. The samples shall be tested for coarse aggregate angularity for RAP containing gravel, binder content, gradation, and moisture content in accordance with the following procedures or other procedures as stated in the QCP.

9.4.1 Binder Content.

- **a)** Extraction (ITM 571). The procedure for the fines correction shall be designated.
- **b)** Nuclear Asphalt Content Gauge (AASHTO T 287).
- c) Ignition Method (ITM 586).

9.4.2 **Gradation (ITM 571).**

9.4.3 Moisture Content (ITM 572).

9.4.4 RAP Coarse Aggregate Angularity (ASTM D 5821)

9.5 Temperatures. The temperature of the Mixture shall be obtained at the mixing plant a minimum of once for each 2 h of production.

- **9.6 Mixture Calibration.** A plant calibration shall be made for each DMF to be produced in accordance with the following methods:
 - **9.6.1 Batch Plants.** the percentage of the total aggregate to be obtained from each hot bin and the recycled material belts.
 - **9.6.2 Drum Plants.** the percentage of the total aggregate to be obtained from each cold bin and the recycled material bins.

10.0 ADJUSTMENT PERIOD.

- 10.1 The Producer will be allowed an adjustment period for each DMF in which changes can be made. The adjustment period shall be from the beginning of production and extending until 4000 t of base or intermediate mixtures or 2400 t of surface mixture has been produced. The production shall be for one contract. A reduced adjustment period may be allowed.
- 10.2 The amount passing the No. 8 (2.36 mm), No. 30 (600 μ m), or No. 200 (75 μ m) sieves on the DMF may be adjusted provided the gradation limits and the dust/calculated effective binder ratio do not exceed the requirements of 401.05. Adjustments to the gradation shall be included in the JMF.
- 10.3 The JMF shall be submitted in writing for approval to the DMTE upon completion of the production of 6000 t of base or intermediate Mixture, 3600 t of surface Mixture, or a reduced adjustment period.
- 10.4 Only one adjustment period will be allowed for each DMF within a construction season. If production extends into the next construction season, the DMF/JMF will be allowed another adjustment period.

11.0 CONTROL CHARTS.

- 11.1 Control charts shall be maintained by the Producer at the Certified Plant laboratory for each DMF and JMF. All test results shall be recorded on the control charts the same day the tests are conducted. As a minimum the charts shall be maintained until 30 test data points have been plotted. Subsequent to that time at least 30 test data points shall be continuously displayed.
- **11.2** All charts shall be retained by the Producer for the Certified Plant for a period of three years.

11.3 Control charts shall be required for:

a) Critical sieves for each aggregate size from stockpile samples as follows (Only when stockpile samples are required in accordance with 9.2):

Product	Critical Sieve
#5	½ in. (12.5 mm)
#8	½ in. (12.5 mm)
#9	$^{3}/_{8}$ in. (9.5 mm)
#11	No. 4 (4.75 mm)
#12	No. 4 (4.75 mm)

The designated critical sieve for any other coarse aggregate;

- **b**) Binder content of Mixture for each DMF and JMF;
- c) Air voids and VMA for each DMF and JMF.
- 11.4 The target mean value for aggregate stockpile samples shall be determined from the aggregate gradations used in the mix design.

The target mean value for blended aggregate samples shall be determined from the mixture calibration, or aggregate blend or mixture gradation used for the DMF. All values may be adjusted once at the completion of the adjustment period.

The target mean values for the binder content of the Mixture and the recycled material shall be determined from the DMF. The target mean value for the air void content shall be 4.0%.

11.5 Control limits from the target mean value for individual test values shall be:

Parameter	Control Limits (s)
Aggregate Stockpile Samples, % Passing Sieves	± 10.0
Blended Aggregate, % Passing Sieve Base and Intermediate Mixtures	
1 in. (25.0 mm)	± 10.0
3/4 in. (19.0 mm)	± 10.0
1/2 in. (12.5 mm)	± 10.0
No. 8 (2.36 mm)	± 10.0
No. 30 (600 μm)	±6.0
No. 200 (75 μm)	±2.0
Blended Aggregate, % Passing Sieve Surface Mixtures	
No. 8 (2.36 mm)	$\pm~8.0$
No. 30 (600 μm)	±4.0
No. 200 (75 μm)	±1.0*
Binder Content of Mixture (%)	±0.7
Binder Content of Recycled Materials, (%)	±0.7
Air Voids @ Ndes (%)	± 1.0
Voids in Mineral Aggregate (Min. %) Mixture Designation	
9.5 mm	14.5
12.5 mm	13.5
19.0 mm	12.5
25.0 mm	11.5
37.5 mm	10.5

^{*} When the recovered aggregate from an ignition oven is used, the tolerance will be \pm 2.0.

11.6 Chart Construction:

- **a**) The target mean value shall be represented by a heavy long dash followed by a short dash line.
- **b)** Control limits shall be represented by heavy solid lines.
- c) The horizontal lines on the chart indicating the control limit(s) and the target mean value shall be numerically identified in the left margin.
- **d**) The plot point for the test result shall be surrounded by a small circle and each consecutive point shall be connected by a solid straight line.

e) The moving average of the most current five test values shall be plotted. The plot points shall be indicated by a small triangle symbol and connected by straight lines.

- f) Test results shall be plotted left to right in chronological order and dates corresponding to each test shall be shown along the horizontal axis.
- g) All values shall be plotted to the nearest 0.1 percent.
- **h)** Test results for samples obtained from other than at the Certified Plant may be plotted on the corresponding chart provided the points are not connected with the test results from the Certified Plant and the test results are not included in the moving average.

Any proposed deviation from these procedures shall be identified in the QCP.

12.0 RESPONSE TO TEST RESULTS.

- **12.1 Control Limits.** The Producer shall take corrective action when the control limits are exceeded. Corrective action shall include, but is not limited to, investigation for assignable cause, correction of known assignable cause, or retesting.
- **12.2 Binder Content of Mixture.** When two consecutive process control tests after the first 4000 t of base or intermediate Mixtures or the first 2400 t of surface Mixtures exceed the control limits for the binder content of the Mixture, production shall be discontinued. Production shall not be resumed without the approval of the DMTE.
- **12.3 Moisture Content.** The Producer shall take corrective action when the moisture content of the HMA sampled at the Certified Plant exceeds 0.3 percent or when the moisture content of the HMA sampled from the pavement exceeds 0.1 percent.
- **12.4 Field Compacted Specimens.** When two consecutive process control tests exceed the control limits for air voids or VMA, production shall be discontinued. Production may be resumed, using the same DMF or JMF, if the Producer verifies that the requirements for air voids and VMA can be met, subject to approval by the DMTE. If the next required process control tests do not meet the requirements for air voids and VMA, then production shall be discontinued and a new DMF will be required.
- 12.5 Failed Material. Failure to discontinue production when required shall subject all Mixture produced after the required discontinuance to be considered as failed material, and this Mixture will be referred to the Chief, Materials and Tests Division for disposition. Certified Plants that have two such referrals within a consecutive twelve month period shall be subject to suspension from the Certified status until such time that deficiencies are corrected to the satisfaction of the Department.

13.0 QUALITY CONTROL PLAN.

13.1 Each Producer providing Mixture under the Program shall have a written QCP which shall be plant specific and be the basis of control. The QCP shall contain, but not be

limited to, the methods of sampling, testing, calibration, verification, inspection, and anticipated frequencies.

- 13.2 The QCP shall include the following information for each Certified Plant.
 - **a)** The location of the Certified Plant site, including the county and reference to the nearest identifiable points such as highways and towns.
 - **b**) The name, telephone number, duties, and employer of the Management Representative and Certified Asphalt Technician(s). The duties of all other personnel responsible for implementation of the QCP shall be included.
 - c) A list of test equipment that is calibrated or verified, the test methods and frequency of calibration or verification of the equipment, and a statement of accessibility of the laboratory to Department personnel. If the laboratory is not located at the Certified Plant, the location of the laboratory shall be designated, and the procedure for transporting the mixture to the laboratory included.
 - **d**) A plant site layout diagram which shall include the location of the stockpile area, binder tanks, fuel tank, additive or modifier supply, anti-adhesive supply, field laboratory, visitor parking area, and major components of the mixing plant.
 - e) A plan for controls of the aggregate and recycled material stockpiles. Controls for identification of stockpiles by signing or other acceptable methods, techniques for construction of proper stockpiles, and cold bin loading procedures shall be included.
 - **f**) A plan for the use of more than one binder grade in a binder tank. The sampling location shall be indicated.
 - **g**) The procedure for the consistent uniform addition of baghouse fines when returned into the mixing plant.
 - **h**) The procedure for using an anti-adhesive agent for the truck bed, and a statement that the agent is on the list of approved anti-adhesive agents.
 - i) The procedure for sealing the surge bin when used for extended storage of the mixture. The written approval of the surge bin shall be included.
 - j) The procedure for loading Mixture into the trucks.
 - **k)** A sampling plan that includes locations, test methods, devices, techniques, frequencies, and sample reduction procedures.
 - 1) A testing plan that includes the types of tests, and test methods.
 - **m**) A description of any other process control techniques that may be used beyond the minimum required by the Department. These controls may include, but are not limited to:
 - 1) Different types or greater frequencies of material testing; or
 - 2) Visual checks, and monitoring of plant production.
 - **n**) A statement of the procedure for handling addenda to the QCP including a time schedule for submittal.
 - **o**) A documentation plan with details on control charting, test data, and the diary. Copies of the forms may be included.
- 13.3 The last page of the QCP shall contain two signature blocks. The right hand block shall be signed and dated at the time of submittal by the Producer's Management Representative and shall include the title of person making the signature. The left hand

block shall be signed and dated at the time of approval by the Chief, Materials and Tests Division.

- 13.4 Production of Mixture shall not begin before the QCP has been approved. The Producer shall submit two copies of the QCP to the Department. One copy shall be submitted to the DMTE, and the other copy to the Materials Certification Engineer. Acceptance or rejection of the QCP will be made within 15 days of receipt of the QCP at the Division. The authentication page will be returned to the Producer after acceptance and approval.
- 13.5 The Producer shall transmit all applicable process control changes to the DMTE in a timely manner for approval. This shall be done in the format of addenda to the QCP. Each page of the QCP that is revised shall include the Certified Plant number, date of revision, and means of identifying the revision. The addenda shall include a signed and dated authentication page.

Addenda may be submitted at the audit close-out meeting or within the first two months of each calendar year. Revisions to the QCP between addenda submittals shall be maintained on an Addenda Summary Sheet in the QCP until such time that the revisions are incorporated into the QCP.

13.6 Movement of the Certified Plant to a new location will require an addendum to the QCP.

14.0 CERTIFICATION.

- **14.1** Each Producer requesting to establish a Certified Plant shall do so in writing to the Chief, Materials and Tests Division.
- **14.2** Upon receipt of the request for certification the DMTE will be notified to inspect the laboratory.
- 14.3 The plant inspection, including the correction of any deficiencies, and calibration of all meters, scales and other measuring devices, shall be completed prior to certification.
- **14.4** Each plant meeting the requirements of the Program will be certified upon the approval of the QCP.
- 14.5 In the event of a change in ownership of the Certified Plant, the certification shall expire on the date of such change. The new ownership may avoid expiration by immediately submitting a statement to the Chief, Materials and Tests Division indicating recognition of the details of the Program, the existing QCP, and a clear pronouncement of intent to operate in accordance with the requirements of both documents.

15.0 DEPARTMENT RESPONSIBILITIES.

15.1 The Department will maintain a listing of all Certified Plants.

15.2 The Department will conduct audits on a random basis at each Certified Plant.

- 15.3 The Department will administer a Certified Asphalt Technician Training Program for those asphalt technicians that perform the required duties for the Certified Plant. Certification of the technicians will be provided by the Department upon passing a certification test. Recertification of the technicians will be required after a period of three years.
- **15.4** Removal from approved status of a Certified Plant will be the responsibility of the Chief, Materials and Tests Division.

The Producer shall have the right to appeal the removal from Certified Plant status to the Engineer.